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with which Mr. Pogson made the observations of the small planets *Fortuna* and *Melpomene*, *Monthly Notices*, vol. xii. pp. 214, 217. The reductions are rather tedious, but when the difference of declination is less than 4′ or more than 6′, Mr. Pogson considers the results may be relied on. The different measures of the diameter of the ring agree very well.

Capt. Shea has presented some suggestions *on the cause of the large quantity of rain* which has recently fallen. His reasoning does not assign the phenomenon to celestial agency, but refers to the condition of the north polar region of the earth; the notice belongs, therefore, to meteorology rather than to astronomy.

In vol. 36 of the *Astronomische Nachrichten*, No. 844, p. 67, M. Luther, of the Bilk Obsorvatory, has given an approximate ephemeris of *Parthenope* for the present opposition. The ephemeris is for Berlin mean midnight, and extends from Jan. 16 to Feb. 25, 1853.

Astronomical Observations made at the Radcliffe Observatory, Oxford, in the year 1850. By Manuel J. Johnson, M.A., Radcliffe Observer. Vol. XXI. royal 8vo. (pp. 300, Introduction pp. xliv). Oxford, 1852.

The explanations necessary for a due appreciation of this work are given in the Introduction. The observations were made chiefly in the meridian, but there are a few determinations with the heliometer.

A detailed description of the meridian instruments has been given in former volumes. The great mass of the objects observed are circumpolar stars. Subordinate to these are the observed places of a limited number of fundamental stars, for the determination of instrumental and clock errors. There are also a few observations of the sun, as well as of the moon and moon-culminating stars.

The results of the circumpolar observations are presented in a catalogue adapted to the mean equinox of 1850·0. The number of stars is 2009. This contribution will serve nearly to complete the important catalogue of circumpolar stars which for several years has occupied so much of Mr. Johnson's attention. The re-observation of Groombridge's Catalogue may be now considered to be finished, and Mr. Johnson has appended to this volume an "Index of Stars in Groombridge's Catalogue, observations of which will be found in the eleventh and preceding volumes of the Radcliffe Observations." Until the Radcliffe Catalogue shall be published in a collected shape, which may soon be expected, this index will enable any one to determine the place of a star with very little trouble.

The circumpolar catalogue is followed by a smaller catalogue

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of fundamental and other stars, whose north polar distances exceed 50°. The number of these stars is eighty-five. After this catalogue there is inserted a comparison of the observed right ascensions and north polar distances of the sun and moon, with the corresponding results of theory, as deducible by interpolation from the *Nautical Almanac.*

The concluding part of the work is devoted to the observations with the heliometer. There is a detailed description of this instrument in the Introduction, accompanied with an engraving at the beginning of the volume. The observations, having been made for studying the peculiarities of the instrument rather than with reference to any particular astronomical purpose, are not published from any conviction of their intrinsic value. They consist of a few measures of double stars, and of the apparent diameters of *Mars* and *Jupiter.* The methods of measurement varied with the objects observed. For double stars, whose components were situate at a moderate distance, the objects were ranged in lines at equal intervals, the moving image being placed alternately east and west of the fixed image. If the distance was considerable, the components of the moving image were brought alternately midway on the line of distance between the components of the fixed image. Generally, however, in such cases the observations were made by contact. The number of double stars observed is twenty-six. There are, however, several measures of each star. The mean result of eight measures of γ *Virginis* assigns 2″·851 as the distance of the two components for the mean epoch, 1850·230. There are a few measures of *Mars*, which were executed in the beginning of January. They give 5″·901 and 6″·503 for the mean values of the polar and equatoreal diameters. From the measures of *Jupiter* Mr. Johnson has deduced an ellipticity amounting to $\frac{1}{15\cdot6}$.

Researches on the Apparent Diameter, the Ellipticity, and the Position of the Axis of Rotation, of the Planet Mars. By Dr. J. A. C. Oudemans, of Leyden. (*Ast. Nach.* No. 838.)

The observations which form the groundwork of these researches were made by Bessel at Königsberg, with the great heliometer. The interval embraced by them extends from 1830 to 1837. As they correspond to very different distances of *Mars* from the earth, they were deemed by M. Oudemans to constitute favourable materials for investigating the circumstances relating to the magnitude, figure, and rotation of the planet. No sensible indications of ellipticity were afforded by the observations. The mean value which they assigned to the semi-diameter corresponding to a distance equal to the mean distance of the earth from the sun, was 4″·664. The inclination of the axis of rotation to the ecliptic was found to be 61° 9′, and the longitude of the ascending node of the planet's equator to be 349° 1′.

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